APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/739,233	12/19/2000	Frank L. Berry	219.38575X00	4418

7590 02/11/2004	EXAMINER
Christopher K. Gagne	KENNEDY, LESA M

ART UNIT	PAPER NUMBER
2151	

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DATE MAILED: 02/11/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

-- The MAILING DATE f this communication appears on the c ver sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) FROM
THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed
  after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any
  earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on <u>19 December 2000</u>.

2a)☐ This action is **FINAL**.   2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is
closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) <u>1-30</u> is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) <u>1-30</u> is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on <u>15 October 2002</u> is/are: a)☐ accepted or b)☒ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☐ All b)☐ Some * c)☐ None of:

      1.☐ Certified copies of the priority documents have been received.

      2.☐ Certified copies of the priority documents have been received in Application No. _____.

      3.☐ Copies of the certified copies of the priority documents have been received in this National Stage
application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

13)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application)
since a specific reference was included in the first sentence of the specification or in an Application Data Sheet.
37 CFR 1.78.

    a) ☐ The translation of the foreign language provisional application has been received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific
reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) <u>4</u>.

4) ☐ Interview Summary (PTO-413) Paper No(s). _____.

5) ☐ Notice of Informal Patent Application (PTO-152)

6) ☐ Other: .

DETAILED ACTION

Remarks

1.   This action is responsive to the application filed December 19, 2000. Claims 1-30 are

pending examination. Claims 1-30 are directed towards the use and arrangement of a translation

and protection table.

2.   To improve the clarity of claim 8, it is recommended that the applicant inserts the word

'in' between 'claimed' and 'claim 7' on line 1.

Information Disclosure Statement

3.   The IDS filed on June 28, 2001 (paper no. 2) has been considered. However, should the

applicant wish that citations for the considered references be printed on the front of any patent

resulting from this application, the proper citations to these references must be provided on a

Form 1449.

4.   The IDS filed on June 17, 2003 (paper no. 4) has been considered.

Specification

5.   The abstract of the disclosure is objected to because it does not describe the claimed

subject matter of the dependent claims. Correction is required. See MPEP § 608.01(b).

Drawings

6.   The drawings are objected to because the label for reference item 410 in Figure 4 is

misspelled. A proposed drawing correction or corrected drawings are required in reply to the

Office action to avoid abandonment of the application. The objection to the drawings will not be

held in abeyance.

Claim Rejections - 35 USC § 103

7.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in
> section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are
> such that the subject matter as a whole would have been obvious at the time the invention was made to a person
> having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the
> manner in which the invention was made.

8.   Claims 1-30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Avery (U.S.

Pub. No. 2004/0015622 in view of Garcia et al. (U.S. Patent No. 6,163,834).

Avery teaches the invention substantially as claimed including a method and apparatus

for implementing speculative prefetching during DMA reads in a message-passing, queue-

oriented bus system (see abstract).

As to claim 1, Avery teaches a host comprising:

a processor (Fig. 3, item 302),

a host memory coupled to said processor (Fig. 3, item 306); and

a host-fabric adapter coupled to said processor (Fig. 3, item 308) and provided to

interface with a switched fabric (Fig. 3, item 318), including one or more fabric-attached I/O

controllers (Fig. 3, item 324; par. 0032; Avery discloses that one or more target channel adapters

are connected to the switch fabric), the host-fabric adapter including logic for accessing a

translation and protection table from said host memory for a data transaction, said translation and

protection table including a plurality of translation entries (par.0031; Avery discloses that a host

channel adapter (host-fabric adapter) uses a translation and protection table for translating virtual

addresses to physical addresses, and validating access to host memory).

However, Avery fails to teach the limitation of said translation and protection table

including at least one region entry, said at least one region entry comprising multiple levels of

translation entries.

However, Garcia teaches a two-level memory region registration and address translation

system and method, including a memory handle table and a translation and protection table

(TPT) (see abstract). Garcia teaches the limitation of a translation and protection table including

a plurality of translation entries and at least one region entry, said at least one region entry

comprising multiple levels of translation entries (col. 4, lines 17-19; Garcia discloses that each

entry in the Memory Handle table corresponds to a plurality of entries in the TPT).

It would have been obvious to one of ordinary skill in the art at the time of the invention

to modify Avery in view of Garcia by expanding the address translation concept to support

regions. One would be motivated to do so to avoid duplication of translation operations.

As to claim 2, the combination of Avery in view of Garcia teaches the host of claim 1,

wherein each of said plurality of translation entries comprises an entry type field to distinguish

between one of said translation entries and said at least one region entry (col. 3, line 3; Garcia

discloses that each translation entry has an owner ID indicating the region to which it belongs),

and said at least one region entry comprises an entry type field to distinguish between one of said

translation entries and said at least one region entry (col. 4, lines 17-19; Garcia discloses that

each Memory Handle table entry has a memory handle field to identify the TPT entries in a

region).

As to claim 3, the combination of Avery in view Garcia teaches the host of claim 1,

wherein said at least one region entry corresponds to a specific region (col. 3, line 66 – col. 4,

line 3; Garcia discloses that a Memory Handle Index is generated for each region during memory

registration).

As to claim 4, the combination of Avery in view of Garcia teaches the host of claim 1,

comprising a key field to validate a key entry that indexes said at least one region entry (par.

0051, Fig. 8A; Avery discloses that a remote key field is used to select appropriate pages for

TPT address translations).

As to claim 5, the combination of Avery in view of Garcia teaches the host of claim 1

wherein said at least one region entry comprises a translation handle field to determine said

translation entry that contains desired page information (col. 4 lines 4-12; Avery discloses that

the memory handle (translation handle) is used in conjunction with the virtual address to access

the TPT entry holding the translation).

As to claim 6, the combination of Avery in view of Garcia teaches the host of claim 1, comprising a region type field to distinguish between a plurality of types of regions (col. 4, lines 46-58; Garcia discloses that each Memory Handle Table entry comprises TPT Start and TPT Extent fields to distinguish between regions).

As to claim 7, the combination of Avery in view of Garcia teaches the host of claim 6, wherein said plurality of types of regions comprises a window region type and a window extension entry type, each window region type being associated with a first window extension entry type and a second window extension entry type (col. 4, lines 46-58; Garcia discloses that a registered memory region (window region) is associated with a TPT start field (first window extension) indicating the starting address of the region, and a TPT Extent field (second window extension) indicating the length of the region).

As to claim 8, the combination Avery in view of Garcia teaches the host in claim 7, wherein data within said first window extension entry type and said second extension entry type relate to a starting address of a mapped region and a length of said mapped region (col. 4, lines 46-58; Garcia discloses that a registered memory region (window region) is associated with a TPT start field (first window extension) indicating the starting address of the region, and a TPT Extent field (second window extension) indicating the length of the region).

As to claim 9, the combination of Avery in view of Garcia teaches the host of claim 1, wherein said host-fabric adapter performs virtual to physical address translation and validates access to said host memory using entries in said translation and protection table (par. 0031; Avery discloses that the host channel adapter (host-fabric adapter) maintains a translation and

protection table that it uses to perform address translations and to validate access rights to the memory).

Claims 10-16 represent network claims that correspond to host claims 1-4 and 6-8, respectively. They do not teach or define any new limitations above claims 1-4 and 6-8, and therefore are rejected for similar reasons.

As to claim 17, the combination of Avery in view of Garcia teaches

an apparatus that stores translation and protection table entries for virtual to physical address translations, and that validates access requests for individual translation and protection table entries said translation and protection table to comprise a plurality of translation entries (par. 0031; Avery discloses that the host channel adapter (host-fabric adapter) maintains a translation and protection table that it uses to perform address translations and to validate access rights to the memory), and

at least one region entry, said at least one region entry to comprise multiple levels of translation entries (col. 4, lines 17-19; Garcia discloses that each entry in a Memory Handle table corresponds to a plurality of entries in a TPT).

Claims 18-22 represent apparatus claims that correspond to host claims 2, 4 and 6-8, respectively. They do not teach or define any new limitations above claims 2, 4 and 6-8, and therefore are rejected for similar reasons.

Claims 23-26 represent host-fabric adapter claims that correspond to host claims 1-2, 4 and 6, respectively. They do not teach or define any new limitations above claims 1-2, 4 and 6, and therefore are rejected for similar reasons.

As to claim 27, the combination of Avery in view of Garcia teaches a method

comprising:

accessing a translation and protection table from said host memory for a data transaction,

said translation and protection table including a plurality of translation entries and at least one

region entry, said at least one region entry comprising multiple levels of translation entries

(par.0031; Avery discloses that a host channel adapter (host-fabric adapter) uses a translation and

protection table for translating virtual addresses to physical addresses, and validating access to

host memory) (col. 4, lines 17-19; Garcia discloses that each entry in a Memory Handle table

corresponds to a plurality of entries in a TPT);

receiving a key entry that indexes one of said translation entry and said region entry (par.

0051, Fig. 8A; Avery discloses that a remote key is used to select appropriate pages for TPT

address translations); and

comparing a key field in said one of said translation entries and said region entry to

validate access (par. 0051, Fig. 8A; Avery discloses that a remote key is used to select

appropriate pages for TPT address translations).

Claims 28-30 represent method claims that correspond to host claims 2 and 6-7,

respectively. They do not teach or define any new limitations above claims 2 and 6-7, and

therefore are rejected for similar reasons.

Any inquiry concerning this communication or earlier communications from the

examiner should be directed to Lesa Kennedy whose telephone number is (703) 305-8865. The

examiner can normally be reached on Monday - Friday, 8:30 am - 5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's

supervisor, Glenton Burgess can be reached on (703) 305-4792. The fax phone number for the

organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding

should be directed to the receptionist whose telephone number is (703) 305-3900.

Lesa Kennedy
Art Unit 2151